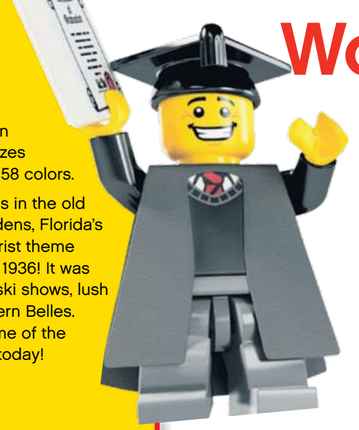
Stellar statistics

Statistics is the science of math. Check out these LEGOLAND® stats.

- It took two million LEGO® bricks and 1,200 hours to build the life-sized LEGO Brontosaurus.
- Each LEGOLAND Kid Power Tower is 32 feet tall.
- Twenty million LEGO bricks were used to build Miniland USA.
- There are 5,258 LEGOLAND Minilanders living in Miniland USA.
- The LEGO TECHNIC® roller coaster has a 42 foot drop.
- It took 1,120,000 LEGO bricks to build a replica of Albert Einstein's head.
- LEGO bricks come in 2,600 shapes and sizes and are available in 58 colors.
- LEGOLAND Florida is in the old site of Cypress Gardens, Florida's first commercial tourist theme park that opened in 1936! It was known for its water ski shows, lush gardens, and Southern Belles. You can still see some of the preserved gardens today!



Planning a future city

Miniland USA is the heart of every LEGOLAND Park. In Winter Haven, Miniland USA will be home to seven specially themed areas including an area representing different cities in Florida, Las Vegas, Washington, D.C. and New York City. The cities shown are landmarks in the USA, and they are all very different and represent different ways of life.

If you could design your own city, what would that city contain? Would it be a tourist location, an agricultural center, a place to preserve history or a place of manufacturing and industry? Use your imagination and build your very own model city of the future.

Suggested materials:

Plastic containers
Construction paper
Empty soda bottles
Paint or crayons
Cardboard
Poster board
Foam cups
Toothpicks
Paper clips
Egg cartons
Pencil
Paper
Toys
Glue
Tape
Clay

Instructions

When you begin designing your future city, remember that a city isn't just a group of buildings. It's a center of population, commerce and culture. That means people will be living, working and playing in your city.

Start by drawing up some plans for your future city. Remember to include places where people will live, play, and go to school and work. Be sure to include transportation from place to place.

When you're done with your plan, start building your city using the materials you've collected.

When you're done, give your city a name and share your city with your class.

Word find

Miniland USA, the heart of every LEGOLAND Park, will be home to the following specially themed areas: Washington, D.C., New York City, Las Vegas, Kennedy Space Center, Daytona and, of course, Florida. Find these places, along with these other important landmarks, in the Word find puzzle.

Mallory Square
White House
Smithsonian
Times Square
Central Park Zoo
Bok Tower
Excalibur
Capitol
Panhandle
Las Vegas

B O U Y G S A J Z T E S T A S D X R K T
O O M L N D Q R U Z M S K U A Q E E A S
T Q K J O O Z Y U I S N U Y N T N Z G W
G B K T F T S G T N E H T O N U J J O W
Y P W E O E I H T L H O C E H R L S K C
N S U A B W S P D P N X C L T E R C F P
N C M T S O E N A A H E I H H B T E Q H
E G E W N H A R R C C Z P W A G C I Y H
W B Z I M H I E R A U Q S S E M I T H M
Y F A R N L W N P A D I R O L F S R F W
O N E A C M W S G I N U M D I X U A V R
R M P D L G Y I L T F C N V P R W L A U
K I Q S M D M A L L O R Y S Q U A R E B
C G H T E J X U I Y L N K V J Q S A M I
I J H N L A S V E G A S D E D N R R S L
T R N Q M D H J U W H C O C Y B B K C A
Y E J E V U O X U K D Z H G Z K K Z W C
K K U S S R T T J X O U V Z G G B O U X
R W W T C E N T R A L P A R K Z O O X E
A H E L G J Z J S N I E A P H V I B A N

Play Your Part!

Orlando Sentinel Newspaper in Education

LEGOLAND FLORIDA

St Petersburg Times Newspaper in Education

LEGOLAND® FLORIDA

Only the best

Once upon a time, there was a **carpenter** named Ole Kirk Kristiansen who had a wooden toy shop. Kristiansen's favorite saying was "Only the best is good enough." As a carpenter, Kristiansen was very good at making wooden toys. His first products were hand-painted wooden cars, animals and pull-toys.

Kristiansen called his business LEGO®, which comes from the Danish phrase *leg godt*, which means "play well." In Latin, it means "I put together," or "I assemble."

Kristiansen's son, Godtfred Kirk Kristiansen, began working alongside his father. In 1955, he came up with the idea of developing the LEGO® System of Play, focusing on LEGO® bricks and the endless possibilities of **construction**. LEGO® sets were first sold in the United States in 1961. Since then, LEGO® bricks have been loved by children of all ages.

Not just a toy

In the book *Sophie's World* by Jostein Gaarder, the 14-year-old main character is asked why LEGO® is "the most **ingenious** toy in the world." She soon learns that LEGO® bricks are like **atoms**. Each brick can be built upon to create something else: something wide and tall, something short and thin or even all of the above. That is pretty cool. LEGO® bricks represent a system for constructing different items, from a tiny car to a huge roller coaster. Do you know what it is called when you study the world in a systematic way? It is called **science**.

LEGOLAND®

The first LEGOLAND® theme park opened in Billund, Denmark, in 1968. There are now five LEGOLAND® parks, including our own park in Winter Haven, Florida. This new park, which opens Oct. 15, 2011, is within 45 minutes driving distance from most places in the Tampa Bay area!

Learning new words

When you study new things, you often come up against some tough vocabulary words!

Most vocabulary words are learned from context clues or good old-fashioned dictionary work. While you read this poster, be sure to highlight or circle words you don't know. Some of the words you may need to look up are in bold type. Try to figure out the words' meanings by looking for clues in the sentences around them. Write down your best guess, and then look the words up in a dictionary. As a group activity, make a list of the words students identified and see which ones stumped the class.

LEGOLAND® Florida and STEM

Teachers and parents, LEGOLAND® is more than fun and adventure. LEGOLAND® Florida offers seven educational programs that incorporate STEM (Science, Technology, Engineering & Mathematics) programs and the Next Generation Sunshine State Standards.

All the programs are fun and interactive, and provide a hands-on learning experience to enhance your classroom and home lessons. Educational programs are 45-minute-long sessions and will be offered November 2011 through June 2012. Instructional educational programs are offered Monday through Friday, depending on the season and availability. Self-guided programs are available seven days a week, depending on the season. Educational resource guides are available upon request.

Programs:

Tall Towers (Grades K-3): Students learn about how structures are made and what makes them strong. They will test their creation on an earthquake table.

Funtastic Gears (Grades K-2): Students build a theme park ride using gears to alter the speed and direction.

Get Moving (Grades 2-5): Students build a car and predict which car will win the race and why. They will learn about friction, inertia and wind resistance.

Energy Lab (Grades 2-6): Students build a solar-powered car; they will collect, store and transfer the solar energy to power the vehicle.

Amazing Machines (Grades 3-6): Students build their own amazing machine equipped with gears, levers, pulleys and motors. They can choose to build either a windmill or a miniature theme park ride.

Dr. Heartbeat (Grades 3-6): Join Dr. Heartbeat and the NXT-bots to complete a variety of life-saving operations and medical procedures using a computer, light and sound sensors, and motors.

Adventure-Bot (Grades 3-6): Go on a mission using the Adventure-bots to retrieve golden marble treasures and hide them from the treasure hunters using a computer, light and sound sensors, and motors.

Call 1-877-350-LEGO to book your school field trip today!

LEGOLAND® Fun Facts

LEGOLAND® Florida will have more than 50 rides, shows and attractions!

- Island in the Sky is a 100-foot rotating platform ride that offers you a 360-degree (that is a full circle) view of the entire 150-acre park.
- The Dragon is an indoor/outdoor roller coaster that will take you back to a time of knights, princesses and **incredible** castles.
- LEGO® City has been created just for kids who like to have fun. Driving School lets kids drive LEGO-themed cars through city streets and earn their own driver's license.
- Do you like driving on the water instead of the streets? Boating School lets kids (and parents) captain their own **vessels** and feel the freedom of being on the open water.
- LEGO® City Rescue Academy is where families in police and fire vehicles compete with each other to put out **simulated** fires and save the day.
- The LEGO TECHNIC® Test Track Coaster is a chance for you and your parents to twist and turn and learn all about **acceleration**, braking, maneuverability and even a bit of g-force (check out the center of this poster for more information).
- Do you like getting wet? Then you will want to zip in and out of waves and dodge water blasts at AQUAZONE® Wave Racers.

- There is plenty for you to explore, along with mysteries to uncover, at the Land of Adventure and the Lost Kingdom Adventure.
- Miniland USA is the heart of LEGOLAND® Florida. It features incredibly detailed United States landmarks built out of millions of LEGO® bricks, and is the home of thousands of "Minilanders," each with their own "built-in" personality.
- Miniland Florida spans the entire state from Mallory Square in Key West to the **antebellum** mansions in the Panhandle. There also are expanded areas showcasing the Kennedy Space Center and Daytona International Speedway, where you can race LEGO-brick® cars!

St. Petersburg Times Newspaper in Education

Newspaper in Education (NIE) is an international program of cooperation between newspapers and schools that encourages the use of the daily paper as an up-to-date, instructional classroom tool. Through NIE, newspapers are used in all subjects as a progressive teaching resource, from primary through adult education levels. NIE motivates students, broadens knowledge and increases life skills. With ever-shrinking school budgets, the newspaper has become an invaluable tool for teachers.

To find out more about the **St. Petersburg Times Newspaper in Education** program, visit tampabay.com/nie or call 800-333-7505, ext. 8138. Follow us on Facebook, Facebook.com/StPeteNIE, and Twitter, twitter.com@stpeteNIE.

To find out more about the **Orlando Sentinel Newspaper in Education** program, visit nieonline.com/Orlando or call 407-420-5295.

This educational poster was created by the St. Petersburg Times NIE program.

Researched and written by Jodi Pushkin, Times NIE manager
Designed by Stacy Rector, Times staff
Photos courtesy of LEGOLAND®

This publication and its activities incorporate the following Next Generation Sunshine State Standards:

Language Arts: LA.2.1.4.1; LA.2.1.4.2; LA.2.1.4.3; LA.2.1.4.4; LA.2.1.4.5; LA.2.1.5.1; LA.2.1.5.2; LA.2.1.5.3; LA.2.1.6.1; LA.2.1.6.2; LA.2.1.6.3; LA.2.1.6.4; LA.2.1.6.5; LA.2.1.6.6; LA.2.1.6.7; LA.2.1.6.8; LA.2.1.6.9; LA.2.1.7.1; LA.2.1.7.5; LA.2.3.1.1; LA.2.3.1.2; LA.2.3.1.3; LA.2.3.2.1; LA.2.3.2.2; LA.2.3.3.1; LA.2.3.3.2; LA.2.3.3.3; LA.2.3.3.4; LA.2.3.4.1; LA.2.3.4.2; LA.2.3.4.3; LA.2.3.4.4; LA.2.3.4.5; LA.2.3.4.6; LA.2.5.1.1; LA.2.5.2.1; LA.2.5.2.2; LA.2.5.2.3; LA.2.5.2.4; LA.3.1.4.1; LA.3.1.4.2; LA.3.1.4.3; LA.3.1.4.4; LA.3.1.5.1; LA.3.1.5.2; LA.3.1.6.1; LA.3.1.6.2; LA.3.1.6.3; LA.3.1.6.4; LA.3.1.6.5; LA.3.1.6.6; LA.3.1.6.7; LA.3.1.6.8; LA.3.1.6.9; LA.3.1.6.10; LA.3.2.2.2; LA.3.3.1.1; LA.3.3.1.2; LA.3.3.1.3; LA.3.3.2.1; LA.3.3.2.2; LA.3.3.3.1; LA.3.3.3.2; LA.3.3.3.3; LA.3.3.3.4; LA.3.3.4.1; LA.3.3.4.2; LA.3.3.4.3; LA.3.3.4.4; LA.3.3.4.5; LA.3.3.4.6; LA.3.5.1.1; LA.3.5.2.1; LA.3.5.2.2;

Science: SC.2.N.1.1; SC.2.N.1.2; SC.2.N.1.3; SC.2.N.1.4; SC.2.N.1.5; SC.2.N.1.6; SC.2.P.10.1; SC.2.P.13.1; SC.2.P.13.3; SC.2.P.13.4; SC.3.E.5.4; SC.3.N.1.1; SC.3.N.1.2; SC.4.N.1.3; SC.3.N.1.4; SC.3.N.1.5; SC.3.N.1.6; SC.3.N.1.7; SC.4.N.1.8; SC.3.N.3.2; SC.3.P.10.1; SC.3.P.10.2

Visit www.LEGOLAND.com or call 877-350-5346 for days and hours of operation.

Science and LEGOLAND®

Exploring with LEGO® Activity

A machine is a device that makes work either easier or faster to do. A windmill is a type of machine that converts the energy of wind into **rotational energy** by using sails or blades.

1. Work in pairs to build Windy Windmill, a motorized model that uses gears and pulleys.
2. Make sure the gears mesh and the pulley belts are in the grooves of the pulley wheels.
3. When the model is built, attach a battery pack to the motor and watch the windmill run.

Now that you have a working model, can you think of ways the windmill has been used or adapted to do work?

Exploring the newspaper activities

Discover energy

Energy represents the capacity to do work or the ability to make things move. Think about where energy comes from. What is the difference between renewable and non-renewable energy? Is it more desirable to use renewable or non-renewable sources? Look for pictures, cartoons, photos and advertisements in your local newspaper that show forms of energy. Print or cut out the photos and create a collage. Next to each image, write whether it is a form of renewable or non-renewable energy. Share the information with your class.

Fierce forces

There are many forces – gravitational, electrical and magnetic – that act at a distance. Look for an article in your local newspaper that discusses an incident involving a particular force. Find the cause-and-effect elements in the article and write a brief paragraph explaining them. Share your observations with your class.

What's up with gravity?

What goes up must come down: That is what gravity is all about. Observe your surroundings. Identify 10 ways gravity is at work in your life. Talk about how things would be different if there were little or no gravity on Earth. Find a newspaper story about something that is related to gravity's effects. Share your story with the class and explain how gravity is involved.

Laws of motion

Sir Isaac Newton was a scientist in the 1600s. He provided crucial theories and ideas about gravity. By 1666, at the age of 23, Newton had written his three laws of motion. Newton also was a mathematician. A simple mathematical formula helped him explain much about our universe. Using your newspaper, find references to at least five instances where math is being used in everyday life. Write these down and add five examples of how you use math in your everyday life. Draw a cartoon representing one of the examples. Share your list and cartoon with your class.

Scavenger hunt

In your daily newspaper, find these amazing machines (words or pictures) we use every day.

- Shovel
- Bicycle
- Rotary mixer
- Electric can opener
- Flagpole cable
- Crane
- Window blinds
- Lever
- Bottle opener
- Tow truck cable
- Pulley

For extra credit, find five more examples and share them with your class.

ANSWER KEY:

Kid Power Tower Answers

a. 200 + 250 = 450

b. No

c. Gearing down

Think about it Answers

1. Gravity
2. Friction
3. G Force
4. Wind resistance

Generating energy

You hear the word "energy" all the time. But what exactly is it? Energy is the ability to do work or move. Energy comes from many sources.

Most of our energy supply comes from fossil fuels, such as oil, coal and gas. Since fossil fuels take millions of years to form, they are effectively non-renewable. That means that every time we use oil, coal and gas, there is less for future use. Also, burning fossil fuels produces waste products that **pollute** the atmosphere.

Energy also occurs naturally in wind, flowing water and sunlight. Using these renewable energy sources offers an alternative power source.

Collecting and storing energy

Energy that is naturally available needs to be collected to be useful. Sometimes energy can be used at the place where it is collected, and sometimes it must be stored and transferred. When energy is transferred from where it is stored to where it is used, some of it escapes as heat.

Potential energy is energy stored up and ready to be used. Kinetic energy is the energy of motion.

Power is a measure of how fast you transfer energy. You can lift an object slowly and work at a low power. Lift it quickly and you work at a high power.

Push or pull = force

Force is any push or pull. Force is needed to provide motion, change direction or speed, and stop. Forces cause objects to move.

Gravity constantly pulls all things toward the center of the earth. The LEGO TECHNIC® Coaster is gravity-powered. You could say gravity keeps everyone grounded and firmly planted on Earth.

Inertia makes an object resist a change of motion. When the LEGO TECHNIC® Coaster speeds up, riders feel pinned to the back of the car. It's inertia that makes it a fun ride! Riders also experience inertia when the car stops and they feel "pushed" forward against the lap bar. Inertia makes your body want to continue moving as it had been moving.

Centrifugal force pulls objects away from the center of motion. AQUAZONE® riders hang on as centrifugal force pulls them to the side of the car, away from the center of the ride.

Wind resistance pushes the riders' hair backward. Riders on many different rides can feel wind resistance. Cars that are low and sleek face less wind resistance.

Friction is another type of force. Friction can cause heat when two surfaces come in contact and rub together. What forces act on a car going down a slope? Friction is the result of surface contact between a car and the slope: Less friction, faster car.

Think about it

How do forces act on coaster riders?

- **On the Kid Power Tower, riders pull the cable to go up, then slowly come down when they let go of the cable. What force helps riders go down?**
- **What force makes your hands feel hot as they rub against the cable?**
- **When the LEGO TECHNIC® Coaster speeds up suddenly, which forces make riders feel pinned back?**
- **When AQUAZONE® riders feel air pushing against them, which force is at work?**

Renewable resources: wind, water and solar power

Windmills collect energy from wind. Large rotors have pitched blades that collect wind energy.

Turbines are powerful waterwheels used in hydroelectric power stations. Hydroelectric power uses water as the source to **generate** electricity.

Solar panels collect energy from the sun.

The need for speed

The people who constructed LEGOLAND® Florida know kids love roller coasters that move fast. But did you know that you cannot actually feel speed? On a roller coaster, it is **acceleration** that produces the excitement you feel. It is acceleration that makes you feel both heavy and weightless. Acceleration is a change in **kinetic** energy and can be a shift in either speed or direction. It's these forces that produce acceleration.

While experiencing acceleration, you may feel heavy or light, feel pushed back into your seat or pushed forward, or feel as though you are moving to the left or to the right. In other words, acceleration makes your heart and stomach jump up and down.

LEGO TECHNIC® Coaster

Riding the LEGO TECHNIC® Coaster at LEGOLAND® Florida is a great way to experience energy forms and acceleration. While you ride the coaster, think about how this vehicle makes the most of potential energy, kinetic energy and gravity.

- Where does LEGO TECHNIC® Coaster have the most potential energy – at the lowest or highest point of the track?
- How does LEGO TECHNIC® Coaster gain more and more potential energy – by going up or by going down the track?
- How does the height of the track affect the amount of potential energy that can be stored?
- At what point in the ride is potential energy changed to kinetic energy?
- How does the dip at the end of the ride help the coaster slow down?

Push-pull machines

Have you ever used a shovel in the sand? Have you ridden a bicycle? Have you seen a flag raised on a flagpole? If so, then you have seen three simple machines at work: levers, gears and pulleys!

Levers move diagonally, and help us lift heavy objects easily. A shovel can be used as a lever. Other examples of using a lever: using a screwdriver to open a paint can, or sitting on a see-saw and lifting the person on the other end. A crane is a lever, and so are piano keys, which use the lever's own power to increase **force**.

Gears are wheels with teeth around the edge. They **mesh** with other gears to cause circular movement, as on an electric can opener. Gears can be used to make things go faster or slower, as on a bicycle. Gears also can change the direction of movement.

Pulleys, like those on a flagpole, are smooth wheels with a groove around the wheel rim. A cable or belt fits into the groove. Two pulleys can be connected by the belt, which enables one pulley to turn the other. Pulleys, like gears, cause faster or slower movement when the size of the pulley wheels is changed.

Kid Power Tower

Think about the Kid Power Tower ride at LEGOLAND®. The car that riders sit in weighs about 200 pounds. Estimate the weight of two riders. About how much total weight do these riders raise when they pull on the **motorized** pulley cable? Would the riders be able to lift this weight without the help of machines? Gearing up and going fast is fun, but going slow can be fun, too. Kid Power Tower's motors and gears create a smooth, powered free fall when riders let go of the cable. What is it called when gears are used to slow the motor down?

What forces act on a car going down a slope?

Friction is the amount of surface contact between a car and the slope: Less friction, faster car. Friction can cause heat when two surfaces come in contact and rub together.

So, how do we reduce friction to make a car go faster? We can

Change the slope's surface: The smoother the surface, the faster the car.

Change the slope's angle: The steeper the slope, the faster the car.

Change the tires: Usually the car will go faster with narrow and smooth tires.

Weight also can make a car go faster or slower. In theory, a heavy object and a lightweight object released at the same time from the same point on a ramp should reach the bottom at the same time. In reality, a light object often travels faster, but not as far. A heavy object often travels slower, but farther. This is due to different amounts of friction in the wheels and axles.

Imagination Zone activity

In teams of two or three, build a car out of LEGO® bricks. Think about forces that would make your car go faster or slower. You want to build a fast car. You can test your car on the Maniac Midway speed ramps, or create your own ramps with things you have in your classroom. Redesign and test your vehicles until you are ready to race. Race the cars on the speed ramp in heats until all cars have raced. Which car went the fastest? Look at the design of the car. Why do you think it was the fastest? Write a fully developed paragraph detailing how you built and raced your car. Be sure to report on the outcome of the race.

Exploring Renewable Energy with LEGO® Activity

Discover how to use the LEGO® Renewable Energy components to collect, store and transfer energy. When energy is stored in a capacitor, it is called potential energy.

When energy is released, it changes to kinetic energy, the energy of motion.

1. Build a model of a theme park ride or a car, with a motor attached.
2. Explore the power of two different energy sources: mechanical and solar.
3. Collect mechanical energy, then solar energy, in the capacitor.
4. Transfer the power to the motor to make the ride run.
5. Which energy source gives the most power?